ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 703 – BUILDINGS

Support – Infra-government services

- 69GI Provision of Air Traffic Control Facilities to support the Three Runway System at the Hong Kong International Airport
- 70GI Provision of Aviation Weather Services Facilities to support the Three-Runway System at the Hong Kong International Airport

Public safety – Fire services

176BF – Provision of Fire Services Facilities to support the Three-Runway System at the Hong Kong International Airport

Members are invited to recommend to the Finance Committee the upgrading of **69GI**, **70GI** and **176BF** to Category A at estimated costs of \$1,902.9 million, \$281.5 million and \$2,605.8 million in money-of-the-day (MOD) prices respectively for the provision of air traffic control facilities, aviation weather services facilities and fire services facilities to support the Three-Runway System (3RS) at the Hong Kong International Airport (HKIA).

PROBLEM

To meet the growing air traffic demand and maintain Hong Kong's competitiveness as an international and regional aviation hub, the Airport Authority Hong Kong (AAHK) is taking forward the 3RS project at the HKIA. In accordance with the requirements of the International Civil Aviation Organization (ICAO), it is necessary for the Civil Aviation Department, the Hong Kong Observatory (HKO) and

the Fire Services Department to provide government facilities to tie in with the implementation programme of the 3RS.

PROPOSAL

2. The Director of Architectural Services, with the support of the Secretary for Transport and Housing, proposes to upgrade the following projects to Category A -

- (a) 69GI at an estimated cost of \$1,902.9 million in MOD prices for the construction of Air Traffic Control Facilities to support the 3RS at the HKIA;
- (b) **70GI** at an estimated cost of \$281.5 million in MOD prices for the construction of Aviation Weather Services Facilities to support the 3RS at the HKIA; and
- (c) **176BF** at an estimated cost of \$2,605.8 million in MOD prices for the construction of Fire Services Facilities to support the 3RS at the HKIA.

3. Details of the above proposals are provided at Enclosures 1 to 3 respectively.

PROPOSED ENTRUSTMENT TO AAHK

4. In view of the exceptionally high degree of integration required amongst the airport facilities under the 3RS project and various government facilities located at different parts of the 3RS project area¹, and the critical interfacing issues such as overlapping works sites, construction works sequences and programme dependence among the proposed works, we plan to entrust the design and construction of the projects to AAHK for better integration, and management of interfacing issues. It would be impractical for AAHK to design and construct the 3RS project, while the Government separately undertakes the design and construction of the projects co-located within the 3RS project area. Due to the significant interfacing issues, the entrustment approach is necessary. A segregated approach will lengthen the design programme as more time would be required for the design consultants of both parties to integrate the design, and this may expose both parties to contractual claims on the potential delay in exchanging design information among the

/consultants

¹ The 3RS project area includes the existing Airport Island and the 650 hectares newly reclaimed land north of existing Airport Island.

consultants. In addition, a segregated approach would involve frequent handover of sites among different contractors of the 3RS project and the government facilities. Such process is not only inefficient as conservative handover schedules would inevitably be adopted in the construction programme, but would also expose both AAHK and the Government to contractual claims from contractors on delayed possession of sites when works could not be timely completed for handover of the sites as scheduled. In view of the above, a segregated approach will not only increase the time and potential costs required for the design and construction of the proposed government facilities, but also give rise to interface and logistics problems, causing delay to the implementation programme of the 3RS.

5. Besides, the existing airport is in round-the-clock operation with heavy air traffic. To avoid disturbance to the operation of the airport and to uphold aviation safety, close coordination amongst parties responsible for airport operation, the construction of the 3RS and the projects is of paramount importance. The proposed entrustment approach would enable both the 3RS works and the government facilities at the same location to be designed and constructed at the same time. Such arrangement will not only ensure better design integration, enable efficient coordination and facilitate control of construction progress under a single managing party, but also ensure timely commissioning of facilities for commencing operation of the 3RS. Moreover, the project sites of the government facilities are remote and physically integrated with the development of the 3RS under the same development Unless the design and construction of the proposed government programme. facilities are entrusted to AAHK, efficient planning and use of resources resulting in timely completion of the 3RS will be difficult, if not impossible, to achieve practically.

6. Having considered the works implementation arrangement and the commissioning requirement of the 3RS project, we consider it necessary to entrust to AAHK the design and construction of the proposed government facilities which will be carried out in conjunction with the 3RS project in a holistic and timely manner.

PUBLIC CONSULTATION

7. Government facilities are part and parcel of the 3RS. AAHK has been implementing an extensive public communication and engagement plan to engage stakeholder groups for the 3RS project. Over the years, AAHK has reached out to promote the 3RS project and conduct regular 3RS briefings as well as airport visits for the business and aviation sectors, community leaders, residents groups, professional and industry organisations, Members of the Legislative Council (LegCo) and District Councils, green groups, schools and academic sector and the media. AAHK has also established five Community Liaison Groups comprising members who are District Councillors and community/resident leaders for the five districts in the vicinity of HKIA (i.e. Islands, Tuen Mun, Tsuen Wan, Kwai Tsing and Shatin), and Professional Liaison Groups comprising relevant professionals/experts and academia to enhance communications.

8. The Subcommittee to Follow Up Issues Relating to the 3RS at the HKIA was set up from 2015 to 2017 under the LegCo's House Committee to study and follow up on issues relating to the 3RS, including the feasibility of the 3RS, its scope and design details, financial arrangement, environmental impacts, and related matters. The construction works of the 3RS commenced in August 2016 and will take around eight years to complete. AAHK will continue to provide a progress update to the LegCo Panel on Economic Development (ED) on a half-yearly basis².

9. We consulted the LegCo Panel on ED on 28 May 2018. Members of the Panel generally supported these projects and did not raise any objection to the submission of the funding proposal to the Public Works Subcommittee. In response to the question raised by a Member, we provide the latest estimated total cost of all government facilities to support the 3RS in paragraph 14 of this paper. Members also asked for information on the services charges, air traffic demand and maximum runway capacities in 2024 and 2030, and the cost breakdown of Controller Working Positions under the procurement of air navigation services equipment. A written reply to the Panel on ED is being prepared.

BACKGROUND OF THE 3RS AND GOVERNMENT FACILITIES

10. The 3RS project comprises reclamation of some 650 hectares of land north of the existing Airport Island, the construction of a new third runway with associated taxiways, aprons and aircraft stands, a new passenger building, expansion of the existing Terminal 2 into a full service processing terminal, a new automated people mover system, a new baggage handling system, related airside and landside works with associated ancillary and supporting facilities. The scale of works is comparable to the construction of a new airport.

11. According to AAHK, the commissioning of the new third runway is scheduled for 2022, after which the existing North Runway will be closed for reconfiguration for about two years. The commissioning of the full 3RS is targeted in end 2024. Upon the full commissioning of the 3RS, the HKIA will have the capacity to handle air traffic demand at least up to 2030, by which time the annual passenger and cargo volume are expected to increase to around 100 million and 9 million tonnes

/respectively

² The latest 3RS progress update was discussed at the meeting of the Panel on ED on 23 April 2018.

respectively. To cater for the growth in air traffic, the relevant government departments need to enhance their services at the HKIA to ensure the safe and efficient operation of the HKIA. The government facilities, which are part and parcel of the 3RS, will need to be provided in batches to tie in with the implementation programme of the 3RS.

12. According to $AAHK^3$, the 3RS project will bring additional economic benefits of \$455 billion (in 2012 dollars) over a 50-year period and additional employment opportunities of 80 000 direct and indirect/induced jobs, which represent a substantial contribution to the Hong Kong economy in the long term.

13. AAHK will self-finance the 3RS project, which is around \$141.5 billion in MOD prices. As stated in the LegCo Brief (THB(T) CR2/582/08) issued on 20 March 2015 and discussed at the meeting of the LegCo Panel on ED on 23 March 2015, a number of government facilities, such as a new air traffic control tower, fire stations, weather monitoring systems, etc., would be required for the operation of the 3RS, and the Government undertook to seek LegCo's funding approval for such works in batches to tie in with the development stages.

14. The estimated project cost of the first batch government facilities is about \$8.1 billion in MOD prices, which consists of \$4.8 billion for the capital works projects (69GI, 70GI and 176BF) and \$3.3 billion, which is subject to further detailed assessment, for the procurement of air navigation service equipment and fire services vehicles under capital non-works items. Planning and preliminary design of the remaining government facilities are underway. The remaining government facilities, mainly for security control, such as customs, immigration, guarantines, port health control and law enforcement, are required within the new passenger building, expanded Terminal 2 and various locations at the airport. In addition, HKO will also require new systems for aviation weather services. The preliminary cost estimate of the remaining government facilities is about \$9 billion to \$9.5 billion in MOD prices, which is subject to review after the completion of the planning and preliminary design. We will seek funding approval from the LegCo for the remaining facilities at a later stage. The latest total estimated cost of government facilities is about \$17.5 billion in MOD prices.

Transport and Housing Bureau June 2018

³ According to Hong Kong International Airport Master Plan 2030, compared with the two-runway system, the 3RS will bring additional economic benefits of \$455 billion (in 2012 dollars) over the period of 2012 to 2061.

69GI - Provision of Air Traffic Control Facilities to support the Three-Runway System at the Hong Kong International Airport

PROJECT SCOPE AND NATURE

The proposed scope of works comprises the construction of the following Air Traffic Control (ATC) facilities to support the Three-runway System (3RS) at the Hong Kong International Airport (HKIA) –

- (a) facilities with a target date for commissioning in 2022 -
 - (i) associated on-airport air navigation service (ANS) equipment shelters¹, platforms and sites to house the new ANS equipment and one equipment room²;
- (b) facilities with a target date for commissioning before end of 2024 –
 - (i) associated on-airport ANS equipment shelters¹, platforms and sites to house the new ANS equipment and two equipment rooms²;
 - (ii) new ATC tower and associated а for Civil Aviation accommodation the (CAD), Department the Hong Kong Observatory (HKO), the Hong Kong Police Force (HKPF) and the Customs and Excise Department (C&ED);
 - (iii) a link bridge between the new ATC tower and the Third Runway Passenger Building (TRPB); and
 - (iv) 14 car parking spaces; and
- (c) an underground cable duct system linking the above facilities with the existing ATC towers and the various on-airport ANS equipment and facilities.

/A

¹ The space within the ANS equipment shelters is shared with other government departments to meet their operational needs.

² The equipment rooms are all provided for other government departments to meet their operational needs.

A location plan, underground cable duct layout plan of the project and an artist's impressions of the proposed ATC tower are at Annexes 1 to 3 to Enclosure 1.

2. Subject to the funding approval of the Finance Committee in this legislative session, we plan to entrust the design and construction works to the Airport Authority Hong Kong (AAHK) for commencing the project in the first quarter of 2019 for completion in phases so as to meet the target commissioning of the new third runway in 2022, after which the existing North Runway will be closed for reconfiguration for about two years, and the full operation of the 3RS in end 2024.

JUSTIFICATION

3. CAD has to ensure the provision of safe and efficient ANS. At present, there are two ATC towers, one as a main tower and one as a backup, to support the existing two runway operation at the HKIA. Due to the long distance between the existing ATC towers and the new third runway under the 3RS as well as obstruction of sight by the new hangar facilities, ground support equipment maintenance facility and TRPB, some of the future new taxiways and parking stands are beyond the line of sight of the existing south ATC tower. Areas visible to the air traffic controllers from the existing south ATC tower are coloured in green at Annex 4 to Enclosure 1. In this connection, a new ATC tower located at an appropriate location is required so that air traffic controllers could have clear and unobstructed views to monitor all aircraft and vehicle movements at the HKIA and provide ATC services in accordance with the requirement of the International Civil Aviation Organization (ICAO)³. Also, a link bridge connecting the new ATC tower and the TRPB is provided to make it easier and safer for staff to access the tower⁴. With the new ATC tower in place under the 3RS operation, it is proposed that the new third runway be under the control of the

/new

³ Under ICAO Doc 9184 "Airport Planning Manual", an ATC tower should be so located and be of such a height that aprons, taxiways, runways and the airspace surrounding the airport, particularly approach and departure areas, are clearly visible from the control room and that future developments of the maneuvering area or future construction of buildings would not restrict this view.

⁴ If access to the new ATC tower is only provided at the ground floor, staff entering or leaving new ATC tower, who may not be familiar with apron operations, have to cross the head of stand road which may result in safety hazards to staff as well as disruption to the airside vehicular traffic. The situation and hazards will be much more severe during inclement weather conditions, such as thunderstorms and typhoons.

new ATC tower⁵, while the Centre Runway and South Runway be under the control of the existing south ATC tower. The existing north ATC tower will be used as backup.

4. In addition to ATC towers, there is also ANS equipment to support the existing two runway operation at the HKIA. The ANS equipment is currently located at the two existing ATC towers, ATC centre and various on-airport locations. To support the air traffic growth to be brought by the 3RS and to enhance the handling capacity of the HKIA, there is a need to procure various new on-airport ANS equipment as well as associated facilities to be used by the CAD for providing air navigation services. The cost for procuring the ANS equipment is not included in this project. For details, please refer to Enclosure 4 to the Legislative Council (LegCo) Paper (LC Paper No. CB(4)1110/17-18(03)) discussed at the meeting of the LegCo Panel on Economic Development (ED) on 28 May 2018. Various equipment shelters, platforms and sites are required to house these additional on-airport ANS equipment and associated facilities. Location of these equipment shelters, platforms and sites are shown at Annex 1 to Enclosure 1.

FINANCIAL IMPLICATIONS

5. We estimate the capital cost of the proposed works to be \$1,902.9 million in money-of-the-day (MOD) prices (please see paragraph 7 below), broken down as follows –

		\$ million (in MOD prices)
(a)	Site works	2.6
(b)	Piling ⁶	127.5
(c)	Building ⁷	426.7
		/(d)

⁵ Pending the commissioning of the new ATC tower by end 2024, the new third runway scheduled for commissioning in 2022 will be under the control of an interim ATC tower constructed on top of AAHK's premise for aircraft recovery equipment store. The interim ATC tower will be fully funded by AAHK to allow CAD and HKO to provide ATC and aviation weather service respectively during the interim Two-Runway System operation (i.e. the operation of the new third runway and the existing South Runway). Upon the commissioning of the new ATC tower, all ATC and aviation weather service functions for the new third runway will be transferred to it. The interim ATC tower will be decommissioned as the TRPB which will be commissioned by end 2024 will block part of its view of the new taxiways.

⁶ Piling works cover construction of piles and all related tests and monitoring.

⁷ Building works cover construction of substructure and superstructure of the ATC tower and associated accommodation for CAD, HKO, HKPF and C&ED and the link bridge.

\$ million

		(in MOD prices)
(d)	Building services ⁸	204.1
(e)	Drainage	8.2
(f)	External works ⁹	369.9
(g)	Additional energy conservation and recycled features	4.6
(h)	Underground cable duct system ¹⁰	239.2
(i)	Communication cable and associated works	46.3
(j)	On-cost payable to AAHK ¹¹	235.8
(k)	Furniture and equipment ¹²	65.0
(1)	Contingencies	173.0
	Total	1,902.9

6. We plan to entrust to AAHK the design and construction of the proposed government facilities which will be carried out in conjunction with the 3RS project in a holistic and timely manner. The construction floor area (CFA) of the new ATC tower and associated accommodation for CAD, HKO, HKPF and C&ED, and the link bridge is about 6 422 square metres (m²). The estimated construction unit cost, represented by the building and building services costs, is

/\$98,225

⁸ Building services works cover electrical installation, ventilation and air-conditioning installation, fire services installation, lift installation and other specialist installations.

⁹ External works cover construction of on-airport ANS equipment shelters, platforms and sites and other equipment rooms.

¹⁰ The underground cable duct system covers construction of cable ducts linking the new facilities with the existing ATC towers and the various on-airport ANS equipment and facilities.

¹¹ The estimated cost (16.5% of the construction cost) is to be charged by AAHK for the design, project management, insurance, construction support and airport on-cost of the project.

¹² The estimated cost is based on an indicative list of furniture and equipment (F&E) required. We plan to entrust the procurement and installation of some of the F&E items to AAHK and the estimated on-cost payable to AAHK (16.5% of the procurement and installation cost) has been included.

98,225 per m² of CFA in MOD prices. Taking into consideration the nature and complexity of the works involved, we consider this unit cost reasonable¹³.

7. Subject to funding approval, we plan to phase the expenditure as follows –

\$ million (MOD)
2.1
56.6
197.7
297.7
471.4
290.2
201.5
182.4
131.7
71.6
1,902.9

8. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period from 2018 to 2028. The contract will provide for price adjustments.

9. We estimate the annual recurrent expenditure arising from the proposed works to be about \$33.1 million. The capital and recurrent costs arising from the proposed works would be taken into consideration when determining the en-route navigation charges and the ATC services charges for AAHK in future.

/ENVIRONMENTAL

¹³ The estimated unit cost includes additional costs for the additional building services provisions such as resilience requirement for electrical, ventilation and air-conditioning installation, and dual feed power supply; special restrictions in construction works due to working within airport restricted area to avoid disturbance to the operation of the existing airport and runways; marine transportation of materials, plant and equipment; and the stringent safety requirement for working at height at exposed area with higher wind loads.

ENVIRONMENTAL IMPLICATIONS

10. The project forms part of the designated project "Expansion of Hong Kong International Airport into a Three-Runway System (3RS)" under the Environmental Impact Assessment (EIA) Ordinance (Cap. 499). The Director of Environmental Protection approved the 3RS EIA report on 7 November 2014, with the Environmental Permit (EP) granted on the same day. We will require the contractors to implement all of the relevant environmental mitigation measures and environmental monitoring and audit (EM&A) requirements specified in the approved EIA report, and shall comply with the relevant conditions under the EP as well as all other applicable statutory environmental requirements during the development of the government facilities.

11. During the construction phase of the government facilities, we will require the contractors to implement mitigation measures not limited to water spraying in site areas, wheel washing and covering of materials on trucks to reduce dust emissions; use of quality powered mechanical equipment, movable noise barriers and noise enclosures for noise mitigation. The contractors shall also ensure full compliance with the construction noise permit system and other requirements of the Noise Control Ordinance; installation of sand/silt removal facilities and implement proper treatment of site runoff to meet requirements and standards under the Water Pollution Control Ordinance.

12. At the planning and preliminary design stages, we have considered measures to reduce the generation of construction waste where possible. In addition, we will require the contractors to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste at public fill reception facilities ¹⁴. We will encourage the contractors to maximise the use of recycled/recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

13. At the construction stage, we will require the contractors to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractors to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of non-inert construction waste at landfills through a trip-ticket system.

/14.

¹⁴ Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354 N). Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

14. We estimate that the project will generate in total about 43 300 tonnes of construction waste. Of these, we will reuse about 38 970 tonnes (90%) of the inert construction waste for the 3RS reclamation works, provided that the reclamation works is ongoing and there is no surplus filling materials on site. We will dispose of the remaining 4 330 tonnes (10%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at landfills is estimated to be about \$0.9 million for this project (based on a unit charge rate of \$200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

HERITAGE IMPLICATIONS

15. The project will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites or buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

16. The project does not require any land acquisition.

ENERGY CONSERVATION, GREEN AND RECYCLED FEATURES

17. This project will adopt various forms of energy efficient features and renewable energy technologies, in particular –

- (a) heat energy reclaim of exhaust air;
- (b) water cooled chiller with variable speed drive;
- (c) demand control of supply air;
- (d) light-emitting diode (LED) type light fittings;
- (e) lift power regeneration; and
- (f) photovoltaic system

18. The total estimated additional cost for adoption of the above energy conservation measures is around \$4.6 million (including \$2.8 million for energy efficient features), which has been included in the cost estimate of this project. The energy efficient features will achieve 11.5% energy savings in the annual energy consumption with a payback period of eight years.

/BACKGROUND

BACKGROUND INFORMATION

19. We upgraded **69GI** to Category B in September 2016. The planning and preliminary design of the project have been completed.

20. The site is a newly reclaimed site and thus the proposed works will not involve any tree removal or tree compensation proposal.

21. We estimate that the proposed works will create about 470 jobs (420 for labourers and another 50 for professional/technical staff) providing a total employment of 10500 man-months.







新航空交通管制指揮塔的構思圖 69GI 香港國際機場三跑道系統的相關航空交通管制設施 ARTIST'S IMPRESSION FOR THE PROVISION OF AIR TRAFFIC CONTROL FACILITIES TO SUPPORT THE NEW AIR TRAFFIC CONTROL TOWER THREE-RUNWAY SYSTEM AT THE HONG KONG INTERNATIONAL AIRPORT





70GI - Provision of Aviation Weather Services Facilities to support the Three-Runway System at the Hong Kong International Airport

PROJECT SCOPE AND NATURE

The proposed scope of works comprises the construction of the following aviation weather services facilities to support the Three-Runway System (3RS) at the Hong Kong International Airport (HKIA) –

- (a) facilities with a target date for commissioning in 2022 -
 - (i) two underground equipment rooms near midpoint to the new third runway;
 - (ii) a meteorological garden and an equipment room in the Western Support Area (WSA); and
 - (iii) equipment sites for meteorological equipment;
- (b) facilities with a target date for commissioning before end of 2024 –
 - (i) an equipment room in the WSA; and
 - (ii) equipment sites for meteorological equipment; and
- (c) an underground cable duct system linking the above facilities with various existing aviation weather services systems and facilities and the Hong Kong Observatory (HKO) offices at the existing and new Air Traffic Control (ATC) towers.

A location plan and underground cable duct layout plan of the project are at Annexes 1 and 2 to Enclosure 2.

2. Subject to the funding approval of the Finance Committee in this legislative session, we plan to entrust the design and construction works to the Airport Authority Hong Kong (AAHK) for commencing the project in the first quarter of 2019 for completion in phases so as to meet the target commissioning of the new third runway in 2022, after which the existing North Runway will be closed for reconfiguration for about two years, and the full operation of the 3RS in end 2024.

/JUSTIFICATION

JUSTIFICATION

3. Within the framework of the International Civil Aviation Organization (ICAO), HKO is the designated meteorological authority and is responsible for the provision of weather services for international air navigation in Hong Kong. In accordance with the International Standards and Recommended Practices of ICAO¹, each runway has to be equipped with its own meteorological equipment to capture the atmospheric conditions at specific locations of the runway for safeguarding the safety of flights taking off and landing. Such information include surface wind speed and direction, runway visual range (RVR), visibility and height of cloud base, measured using equipment such as anemometers, RVR transmissometers, forward scatterers and ceilometers respectively.

4. Furthermore, for the safe and efficient operation of the new third runway, windshear alerting, wake vortex and lightning sensing equipment commensurate with the standards for the existing runways are required for the new third runway. In addition, considering the distance of the new third runway from the existing meteorological facilities, a new meteorological garden and a new wind profiler are required for measuring the surface and upper air conditions near the new third runway.

5. Equipment rooms and associated facilities such as cabling are required to house and support the above equipment. The spatial provisioning of HKO's equipment follows the International Standards and Recommended Practices of the World Meteorological Organization (WMO) and ICAO², for instance, the RVR transmissometer for the touchdown zone should be located about 300 metres from the start of the landing zone and at a lateral distance of not more than 120 metres from the runway centre line. The planning of the relevant system for aviation weather services is underway and we will seek funding approval from the Legislative Council (LegCo) for these systems separately at a later stage.

6. HKO had consulted the aviation users through the Liaison Group on Aviation Weather Services and the Windshear and High Impact Weather Panel, consisting the AAHK, pilots and airlines, on the relevant meteorological facilities and systems in support of the 3RS respectively and they were supportive of HKO's proposals.

/FINANCIAL

¹ ICAO Annex 3 – Meteorological Service for International Air Navigation.

² WMO Guide to Meteorological Instruments and Methods of Observation WMO-No. 8, ICAO Annex 3 / WMO Technical Regulations Volume II – Meteorological Service for International Air Navigation, and ICAO Manual of Aeronautical Meteorological Practice (Doc. 8896).

FINANCIAL IMPLICATIONS

7. We estimate the capital cost of the project to be \$281.5 million in money-of-the-day (MOD) prices (please see paragraph 9 below), broken down as follows –

		\$ million (in MOD prices)
(a)	Site works	1.3
(b)	Building	14.3
(c)	Building services	7.6
(d)	Drainage	4.7
(e)	External works 16.9	
(f)	Additional energy conservation and recycled features	0.1
(g)	Underground cable duct system ³	136.8
(h)	Communication cable and associated works	36.7
(i)	On-cost payable to AAHK ⁴	36.0
(j)	Furniture and equipment ⁵	1.5
(k)	Contingencies	25.6
	Total	281.5

/8.

³ The underground cable duct system covers construction of cable ducts linking the new facilities with the HKO offices at the existing and the new ATC towers and the various existing aviation weather services systems and facilities.

⁴ The estimated cost (16.5% of the construction cost) is to be charged by AAHK for the design, project management, insurance, construction support and airport on-cost of the project.

⁵ The estimated cost is based on an indicative list of furniture and equipment (F&E) required. We plan to entrust the procurement and installation of some of the F&E items to AAHK and the estimated on-cost payable to AAHK (16.5% of the procurement and installation cost) has been included.

Enclosure 2 to PWSC(2018-19)25

8. We plan to entrust to AAHK the design and construction of the proposed government facilities which will be carried out in conjunction with the 3RS project in a holistic and timely manner. We consider the estimated project cost reasonable when compared to that of other projects built by the Government.

9. Subject to funding approval, we plan to phase the expenditure as follows –

Year	\$ million (MOD)
2018 - 2019	1.1
2019 - 2020	18.9
2020 - 2021	30.4
2021 - 2022	30.8
2022 - 2023	43.9
2023 - 2024	44.8
2024 - 2025	48.2
2025 - 2026	37.1
2026 - 2027	18.6
2027 - 2028	7.7
	281.5

10. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period 2018 to 2028. The contract will provide for price adjustments.

11. We estimate the annual recurrent expenditure arising from the proposed works to be about \$6.1 million. The capital and recurrent costs arising from the proposed works would be taken into consideration when determining the service charges for AAHK in future.

/ENVIRONMENTAL

ENVIRONMENTAL IMPLICATIONS

12. The project forms part of the designated project "Expansion of Hong Kong International Airport into a Three-Runway System (3RS)" under the Environmental Impact Assessment (EIA) Ordinance (Cap. 499). The Director of Environmental Protection approved the 3RS EIA report on 7 November 2014, with the Environmental Permit (EP) granted on the same day. We will require the contractors to implement all of the relevant environmental mitigation measures and environmental monitoring and audit (EM&A) requirements specified in the approved EIA report, and shall comply with the relevant conditions under the EP as well as all other applicable statutory environmental requirements during the development of the government facilities.

13. During the construction phase of the government facilities, we will require the contractors to implement mitigation measures not limited to water spraying in site areas, wheel washing and covering of materials on trucks to reduce dust emissions; use of quality powered mechanical equipment, movable noise barriers and noise enclosures for noise mitigation. The contractors shall also ensure full compliance with the construction noise permit system and other requirements of the Noise Control Ordinance; installation of sand/silt removal facilities and implement proper treatment of site runoff to meet requirements and standards under the Water Pollution Control Ordinance.

14. At the planning and preliminary design stages, we have considered measures to reduce the generation of construction waste where possible. In addition, we will require the contractors to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste at public fill reception facilities ⁶. We will encourage the contractors to maximise the use of recycled/recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

15. At the construction stage, we will require the contractors to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractors to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of non-inert construction waste at landfills through a trip-ticket system.

/16.

⁶ Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354 N). Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

16. We estimate that the project will generate in total about 1 400 tonnes of construction waste. Of these, we will reuse about 1 260 tonnes (90%) of the inert construction waste in the 3RS reclamation works, provided that the reclamation works is ongoing and there is no surplus filling materials on site. We will dispose of the remaining 140 tonnes (10%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at landfills is estimated to be \$0.1 million for this project (based on a unit charge rate of \$200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

HERITAGE IMPLICATIONS

17. The project will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites or buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

18. The project does not require any land acquisition.

ENERGY CONSERVATION, GREEN AND RECYCLED FEATURES

19. Given its small building works scope and location at airfield, this project will only adopt the following energy efficient features –

- (a) variable refrigerant volume air-conditioning system; and
- (b) light-emitting diode (LED) type light fittings.

The total estimated additional cost for the above features is around \$50,000, which has been included in the cost estimate of this project. These features will achieve 5.5% energy savings in the annual energy consumption with a payback period of about nine years.

BACKGROUND INFORMATION

20. We upgraded **70GI** to Category B in September 2016. The planning and preliminary design of the project have been completed.

21. The site is a newly reclaimed site and thus the proposed works will not involve any tree removal or tree compensation proposal.

22. We estimate that the proposed works will create about 45 jobs (40 for labourers and five for professional/technical staff) providing a total employment of 1 850 man-months.







176BF – Provision of Fire Services Facilities to support the Three-Runway System at the Hong Kong International Airport

PROJECT SCOPE AND NATURE

The proposed scope of works comprises the construction of following fire services facilities to support the Three-Runway System (3RS) at the Hong Kong International Airport (HKIA) –

- (a) facilities in the Western Support Area (WSA) with a target date for commissioning in 2022
 - (i) an airside fire station with a 9-bay appliance room;
 - (ii) a speed boat launching facility; and
 - (iii) a decontamination facility;
- (b) facilities in Eastern Support Area (ESA) with a target date for commissioning before end of 2024
 - (i) an airside fire station with a 9-bay appliance room; and
 - (ii) a landside fire station-cum-ambulance depot with a 7-bay appliance room; and
- (c) an underground cable duct system linking the above facilities with the existing fire services facilities and the new and existing Air Traffic Control (ATC) towers.

A location plan, underground cable duct layout plan and artist's impression of the project are at Annexes 1 to 7 to Enclosure 3.

2. Subject to the funding approval of the Finance Committee in this legislative session, we plan to entrust the design and construction works to the Airport Authority Hong Kong (AAHK) for commencing the project in the first quarter of 2019 for completion in phases so as to meet the target commissioning of the new third runway in 2022, after which the existing North Runway will be closed for reconfiguration for about two years, and the full operation of the 3RS in end 2024.

JUSTIFICATION

The Airport Fire Contingent of the Fire Services Department (FSD) 3. is responsible for performing firefighting and emergency rescue operations as well as providing emergency ambulance services in cases of aircraft accidents at the HKIA and its surrounding areas and waters. According to the International Standards and Recommended Practices of the International Civil Aviation Organization (ICAO), the rescue and firefighting services at an aerodrome should be able to achieve a response time not exceeding two minutes to any point of each operational runway, and to achieve a response time not exceeding three minutes to any other part of the movement area, in optimum visibility and surface conditions. There are two existing airport fire stations at the HKIA, namely the Main Airport Fire Station located near the existing South Runway and the Sub Airport Fire Station located near the existing North Runway. In addition, there are two rescue boat berths at the HKIA located at the eastern and western ends of the existing runways respectively.

4. However, with the development of the 3RS, the two existing airport fire stations will be unable to achieve the aforesaid response times for incidents on the new third runway and the associated aircraft movement areas. In order to provide swift aircraft rescue and firefighting services to support the safe operation of the HKIA and to meet the ICAO requirements, two new airside fire stations are required to be established at the WSA and ESA of the 3RS to achieve the aforesaid response times. Furthermore, a landside fire station-cum-ambulance depot is necessary for delivering emergency services to the new buildings in the 3RS and providing support to the airside fire stations in the event of a major aircraft incident. In addition, a speedboat launching facility near the WSA will facilitate the prompt turn-out of speedboats in the event of aircraft emergencies, and a decontamination facility is essential for carrying out mass decontamination in case of chemical, biological, radiological and nuclear incidents at the HKIA.

5. To provide swift aircraft firefighting, rescue and emergency ambulance services in support of the 3RS, certain types of fire services vehicles have to be provided at the additional fire services facilities. The cost for procuring the fire services vehicles is not included in this project. For details, please refer to Enclosure 5 to the Legislative Council (LegCo) Paper (LC Paper No. CB(4)1110/17-18(03)) discussed at the meeting of the LegCo Panel on Economic Development on 28 May 2018.

/FINANCIAL

FINANCIAL IMPLICATIONS

6. We estimate the capital cost of the proposed works to be \$2,605.8 million in money-of-the-day (MOD) prices (please see paragraph 8 below), broken down as follows –

		\$ million (in MOD prices)
(a)	Site works	7.4
(b)	Foundation ¹	427.2
(c)	Building ²	783.0
(d)	Building services ³	176.3
(e)	Drainage	74.7
(f)	External works ⁴	136.2
(g)	Additional energy conservation, green and recycled features	32.1
(h)	Underground cable duct system ⁵	141.2
(i)	Communication cable and associated works	23.5
(j)	On-cost payable to AAHK ⁶	297.3

/(k)

¹ Foundation works cover construction of piles, footings and all related tests and monitoring.

² Building works cover construction of substructure and superstructure of the fire services facilities.

- ³ Building services works cover electrical installation, ventilation and air-conditioning installation, fire service installation, lift installation and other specialist installations.
- ⁴ External works cover construction of fuel filling facilities with an underground fuel tank to each of the fire stations together with all the hard and soft landscaping at external area.

⁵ The underground cable duct system covers construction of cable ducts linking the new fire services facilities with the existing fire services facilities and the new and existing ATC towers.

⁶ The estimated cost (16.5% of the construction cost) is to be charged by AAHK for the design, project management, insurance, construction support and airport on-cost of the project.

			<pre>\$ million (in MOD prices)</pre>
(k)	Furniture and equipment ⁷		270.0
(1)	Contingencies		236.9
		Total	2,605.8

7. We plan to entrust to AAHK the design and construction of the proposed government facilities which will be carried out in conjunction with the 3RS project in a holistic and timely manner. The total construction floor area (CFA) of **176BF** is about 17 241 square metres (m^2). The estimated construction unit cost, represented by the building and building services costs, is \$55,641 per m^2 of CFA in MOD prices. Taking into consideration the different design requirement to suit airport operation, we consider this unit cost comparable to similar projects built by the Government⁸.

8. Subject to funding approval, we plan to phase the expenditure as follows –

Year	\$ million (MOD)
2018 - 2019	2.1
2019 - 2020	149.7
2020 - 2021	210.6
2021 - 2022	313.7
2022 - 2023	348.7
2023 - 2024	406.8

/2024 - 2025

⁷ The estimated cost is based on an indicative list of furniture and equipment (F&E) required. We plan to entrust the procurement and installation of some of the F&E items to AAHK and the estimated on-cost payable to AAHK (16.5% of the procurement and installation cost) has been included.

⁸ The estimated unit cost includes additional costs for special restrictions in construction works due to working within restricted airport area to avoid disturbance to the operation of the existing airport and runways; and marine transportation of materials, plant and equipment.

Year	\$ million (MOD)
2024 - 2025	574.6
2025 - 2026	278.7
2026 - 2027	199.9
2027 – 2028	121.0
	2,605.8

9. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period from 2018 to 2028. The contract will provide for price adjustments.

10. We estimate the annual recurrent expenditure arising from the proposed works to be about \$236.8 million.

ENVIRONMENTAL IMPLICATIONS

11. The project forms part of the designated project "Expansion of Hong Kong International Airport into a Three-Runway System (3RS)" under the Environmental Impact Assessment (EIA) Ordinance (Cap. 499). The Director of Environmental Protection approved the 3RS EIA report on 7 November 2014, with the Environmental Permit (EP) granted on the same day. We will require the contractors to implement all of the relevant environmental mitigation measures and environmental monitoring and audit (EM&A) requirements specified in the approved EIA report, and shall comply with the relevant conditions under the EP as well as all other applicable statutory environmental requirements during the development of the government facilities.

12. During the construction phase of the government facilities, we will require the contractors to implement mitigation measures not limited to water spraying in site areas, wheel washing and covering of materials on trucks to reduce dust emissions; use of quality powered mechanical equipment, movable noise barriers and noise enclosures for noise mitigation. The contractors shall also ensure full compliance with the construction noise permit system and other requirements of the Noise Control Ordinance; installation of sand/silt removal facilities and implement proper treatment of site runoff to meet requirements and standards under the Water Pollution Control Ordinance.

13. At the planning and preliminary design stages, we have considered measures to reduce the generation of construction waste where possible. In addition, we will require the contractors to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste at public fill reception facilities ⁹. We will encourage the contractors to maximise the use of recycled/recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

14. At the construction stage, we will require the contractors to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractors to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of non-inert construction waste at landfills through a trip-ticket system.

15. We estimate that the project will generate in total about 48 000 tonnes of construction waste. Of these, we will reuse about 43 200 tonnes (90%) of inert construction waste in the 3RS reclamation works, provided that the reclamation works is ongoing and there is no surplus filling materials on site. We will dispose of the remaining 4 800 tonnes (10%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at landfill sites is estimated to be \$1.0 million for this project (based on a unit charge rate of \$200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

HERITAGE IMPLICATIONS

16. The project will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites or buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

17. The project does not require any land acquisition.

/ENERGY

⁹ Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354 N). Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

ENERGY CONSERVATION, GREEN AND RECYCLED FEATURES

18. This project will adopt various forms of energy efficient features and renewable energy technologies, in particular –

- (a) variable refrigerant volume air-conditioning system;
- (b) heat energy reclaim of exhaust air;
- (c) light-emitting diode (LED) type light fittings;
- (d) lift power regeneration; and
- (e) photovoltaic system.

19. For greening features, we will provide landscaping and vertical greening in the appropriate areas for environmental and amenity benefits.

20. For recycled features, we will adopt a rainwater harvesting system for landscape irrigation and/or cleansing with a view to conserving water.

21. The total estimated additional cost for adoption of the above energy conservation measures, greening features and recycled features is around \$32.1 million (including \$1.0 million for energy efficient features), which has been included in the cost estimate of the project. The energy efficient features will achieve 5.5% energy savings in the annual energy consumption with a payback period of about 8.5 years.

BACKGROUND INFORMATION

22. We upgraded **176BF** to Category B in September 2016. The planning and preliminary design of the project have been completed.

23. The site is a newly reclaimed site and thus the proposed works will not involve any tree removal or tree compensation proposal.

24. We estimate that the proposed works will create about 550 jobs (500 for labourers and 50 for professional or technical staff), providing a total employment of 13 150 man-months.





附件3 附錄2

位於西面航空輔助設施用地的機場消防局 的構思圖 ARTIST'S IMPRESSION FOR AIRSIDE FIRE STATION AT WESTERN SUPPORT AREA	176BF 香港國際機場三跑道系統的 PROVISION OF FIRE SERVICES FAC THREE-RUNWAY SYSTEM AT THE HONG F



的相關消防設施 CILITIES TO SUPPORT THE KONG INTERNATIONAL AIRPORT



ARCHITECTURAL SERVICES DEPARTMENT 建築署



快艇下水設施的構思圖 ARTIST'S IMPRESSION FOR SPEED BOAT LAUNCHING FACILITY 176BF

香港國際機場三跑道系統的相關消防設施

PROVISION OF FIRE SERVICES FACILITIES TO SUPPORT THE THREE-RUNWAY SYSTEM AT THE HONG KONG INTERNATIONAL AIRPORT

附件3 附錄4



洗消設施的構思圖 ARTIST'S IMPRESSION FOR DECONTAMINATION FACILITY	176BF 香港國際機場三跑道系統的 PROVISION OF FIRE SERVICES FAC THREE-RUNWAY SYSTEM AT THE HONG

附件3 附錄5



的相關消防設施 CILITIES TO SUPPORT THE KONG INTERNATIONAL AIRPORT



ARCHITECTURAL SERVICES DEPARTMENT 建築署

位於東面航空輔助設施用地的機場 消防局的構思圖 ARTIST'S IMPRESSION FOR AIRSIDE FIRE STATION AT EASTERN SUPPORT AREA	176BF 香港國際機場三跑道系統的 PROVISION OF FIRE SERVICES FAC THREE-RUNWAY SYSTEM AT THE HONG I



的相關消防設施 CILITIES TO SUPPORT THE KONG INTERNATIONAL AIRPORT



ARCHITECTURAL SERVICES DEPARTMENT 建築署

位於機場非禁區的消防局暨救訊 的構思圖 ARTIST'S IMPRESSION FOR LA FIRE STATION-CUM-AMBULAN	隻站 NDSIDE CE DEPOT	176BF THREI	PROVISIC E-RUNWA	香港國 N OF FIF Y SYSTE	際機場 RE SEF M AT T	三跑道系 RVICES F HE HON	統的 FAC





